OVERVIEW, NASA PROPAGATION STUDIES

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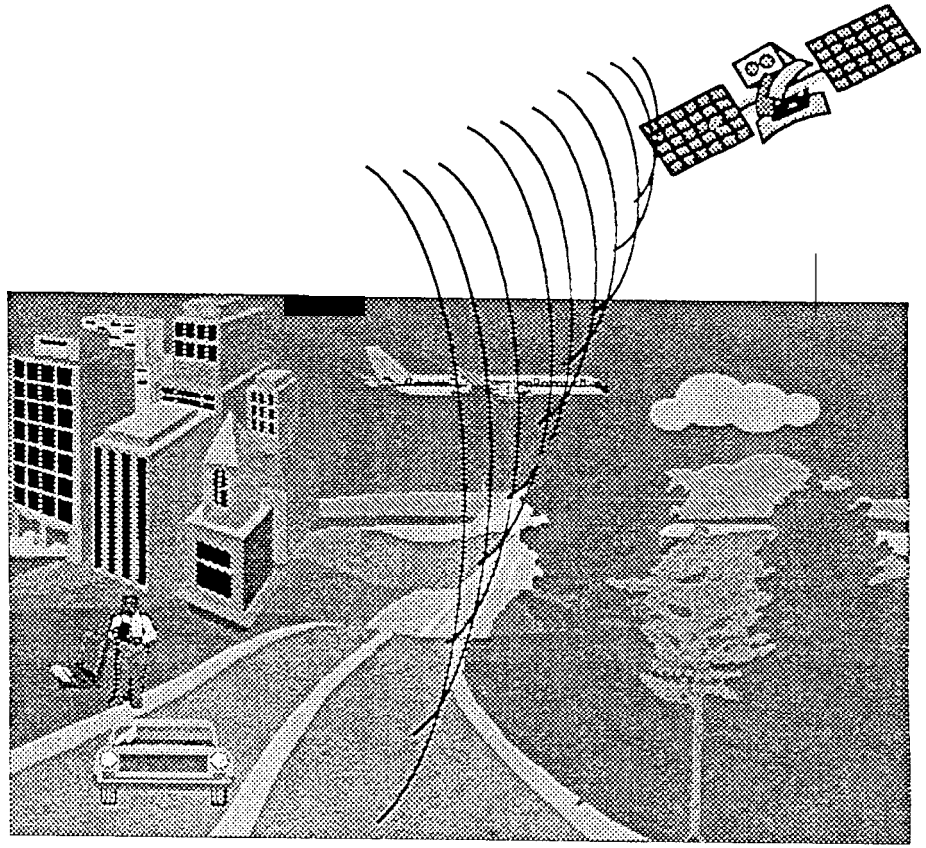
OBJECTIVE & RATIONALE

- OBJECTIVE: To enable the development of new commercial satellite systems and services and to support NASA's programs by providing timely data and models about propagation of satellite radio signals through the intervening environment

- RATIONALE: Characterization of signal propagation is key to design of new satellite systems and many NASA missions. NASA has unique Space assets to support this activity.



APPROACH

- Leverages unique NASA assets (currently ACTS) and other resources to obtain propagation data
- Relies on partnership between NASA, industry, and universities:
  - University of Alaska at Fairbanks
  - University of Texas at Austin
  - Johns Hopkins University
  - Colorado University
  - New Mexico State University
  - Florida Atlantic University
  - University of Oklahoma
  - University of British Colombia.
  - Comsat Laboratories
  - Stanford Telecom
  - Westenhaver Wizard Works
- Disseminates data and models through refereed journals, NASA reference handbooks, workshops, electronic media, and direct interface with industry
  - NAPEX and ACTS Workshops conducted every year
    - Major Satellite Communications industry (AT&T, MOTOROLA, TRW, HUGHES, ORION, SPACE SYSTEMS LORAL), attended latest NAPEX Conference

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CURRENT Activities

- ACTS Propagation Campaign
  - Rain intensity and satellite signal attenuation measured at 20 & 27 GHZ at 7 sites in North America
  - Uses ACTS Beacons at 20 and 27 GHz
  - 20 station-years of data collected so far, plans call for 34 station-years by December 1998.
- Revision of Global Rain Effects Propagation Models
  - ACTS I-(a-band Propagation data indicate a need for revision of existing models
  - Work for revision of Global Rain Effects Propagation Modei started by Professor Crane
- Revision of NASA Propagation Effects Handbook by Dr. L Ippolito
- Propagation Handbook and Models for Second Generation Mobile and LEO Satcom Systems
  - Revision of Propagation Effects Handbook for Mobile & Personal Satellite Communications Design started by Professors J. Goldhirsh and W. Vogel to extend the existing handbook to Ka-band and LEO Systems
  - Generation of computerized models for prediction of propagation effects for mobile and LEO satcom systems

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UPCOMING WORKSHOPS AND CONFERENCES

- NAPEX/ACTS Propagation Conference, Los Angeles, California, June 9-11, 1997
  - Results, twenty station-years of ACTS Ka-band propagation data
  - Overview of work in progress on:
    - Revised NASA Propagation Handbooks,
    - Global Rain Effects Propagation Model for design of Ka-band satellite systems,
    - Computerized propagation models for mobile and LEO satellite systems

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INTERNATIONAL COLLABORATION

- Strong interest in collaboration with international organizations
  - Reciprocal arrangements for sharing of propagation data
  - Joint efforts to develop internationally accepted propagation models

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